

Common Sense: Not So Common

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Problem statement

Which statement of the two is against common sense?

He put a turkey into the fridge
He put an elephant into the fridge



he was sent to a restaurant for treatment
he was sent to a hospital for treatment



Dataset

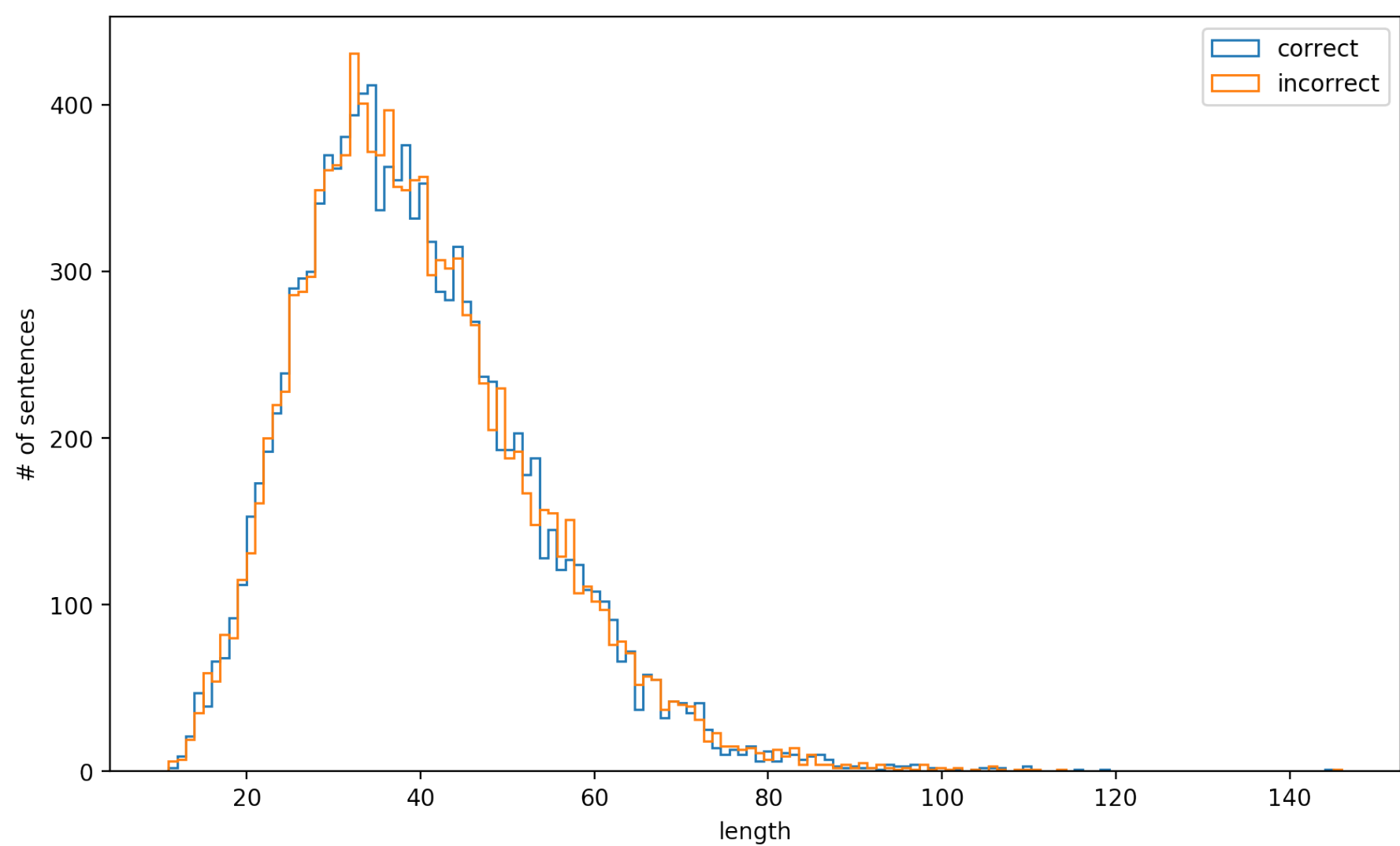


Figure: Distribution of sentence lengths [Wang et al., 2019]

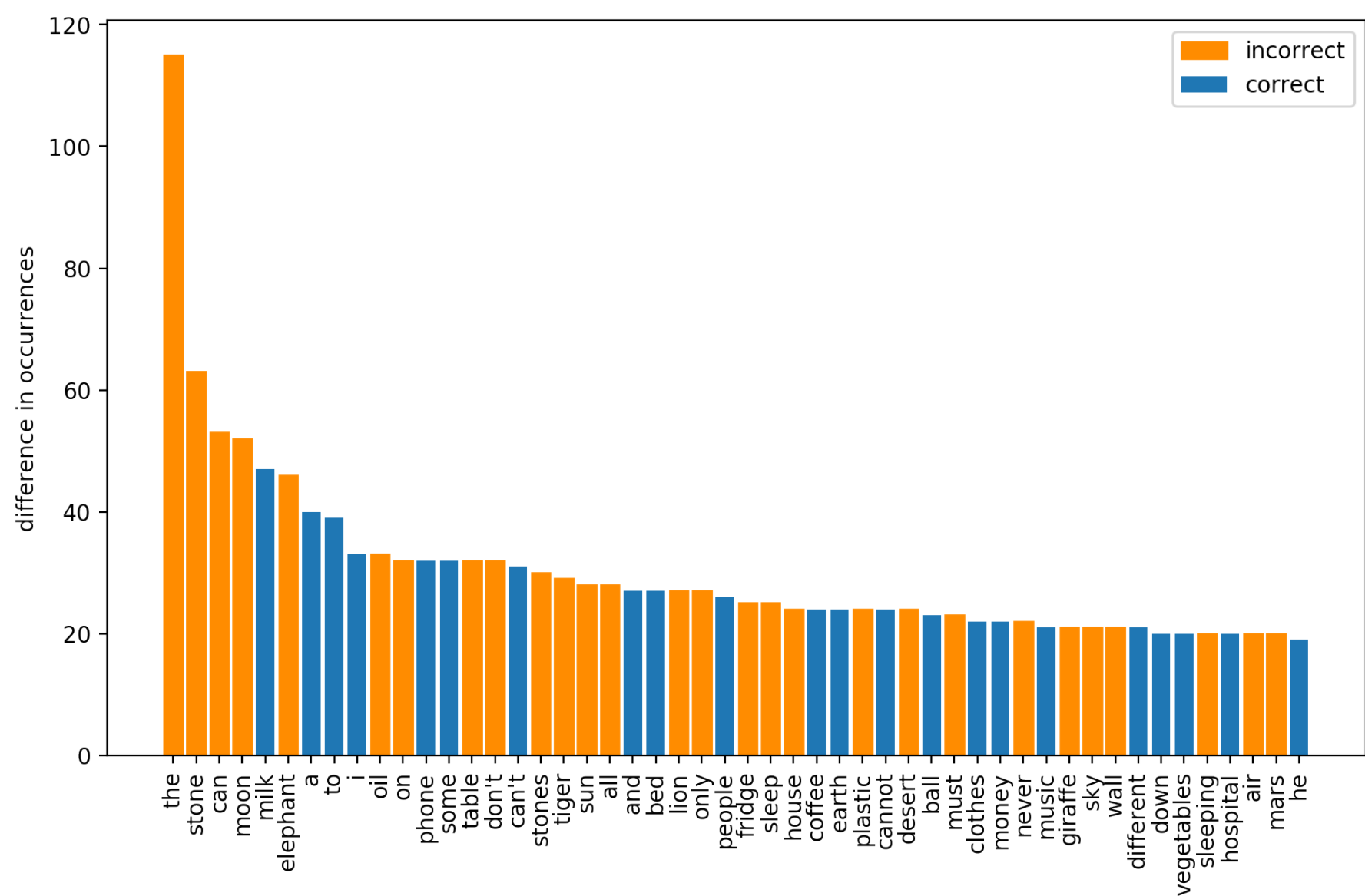
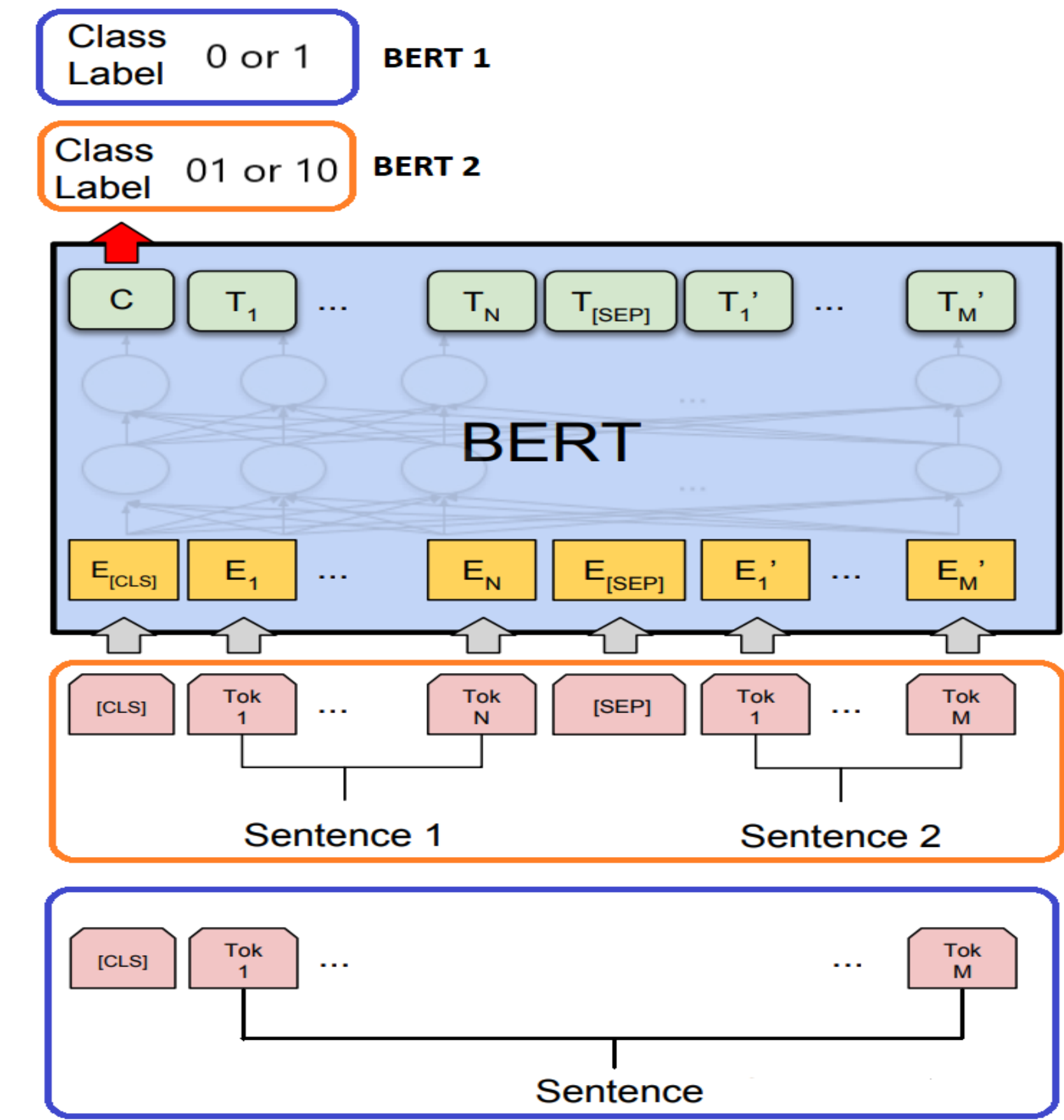
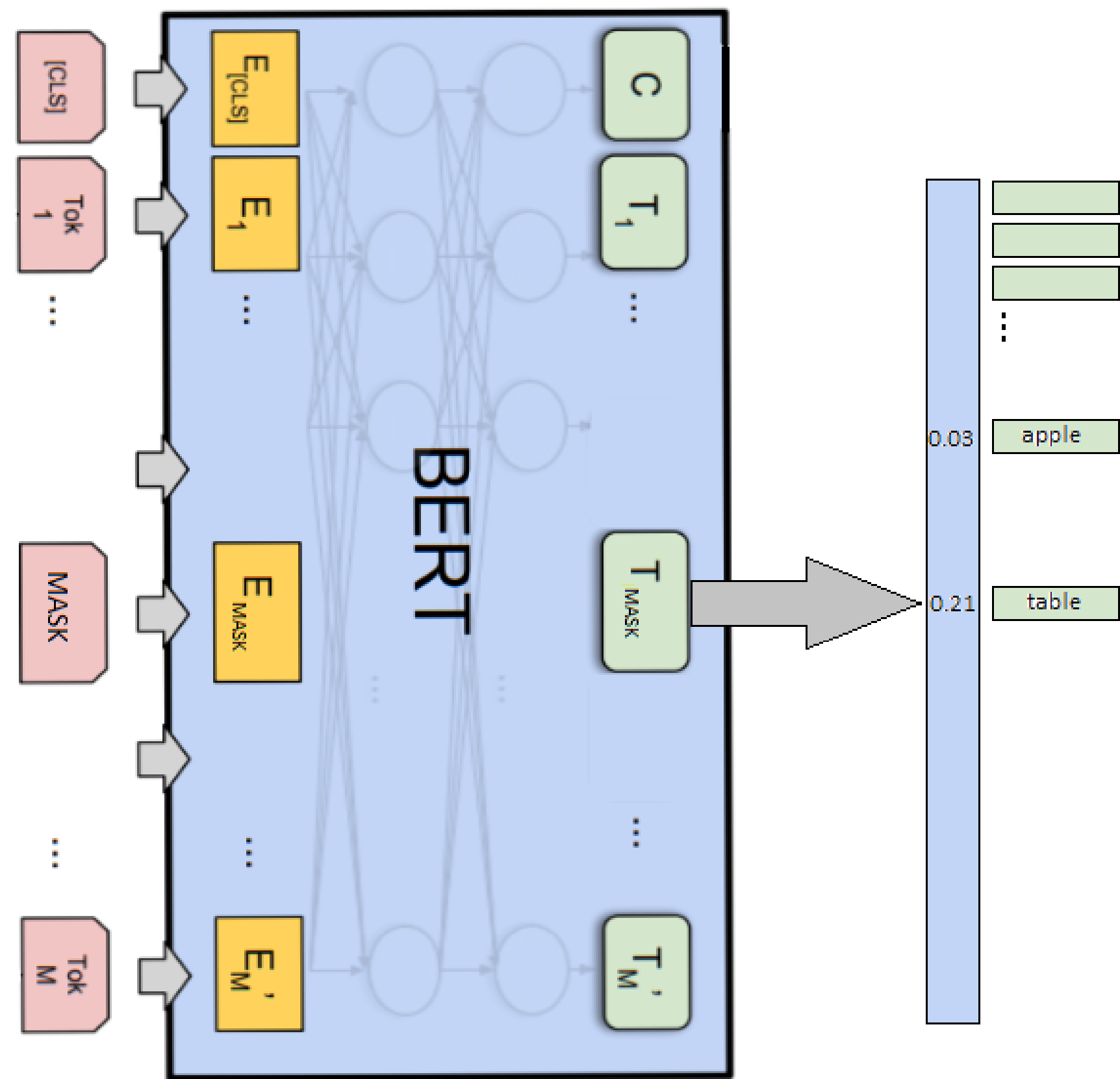


Figure: Absolute difference in word count.

Baseline and approach



(a) BERT For Sequence Classification finetuned using single sentence input



(b) BERT [Devlin et al., 2018] For Masked Language Modelling evaluated on a subset of the data

Experiments

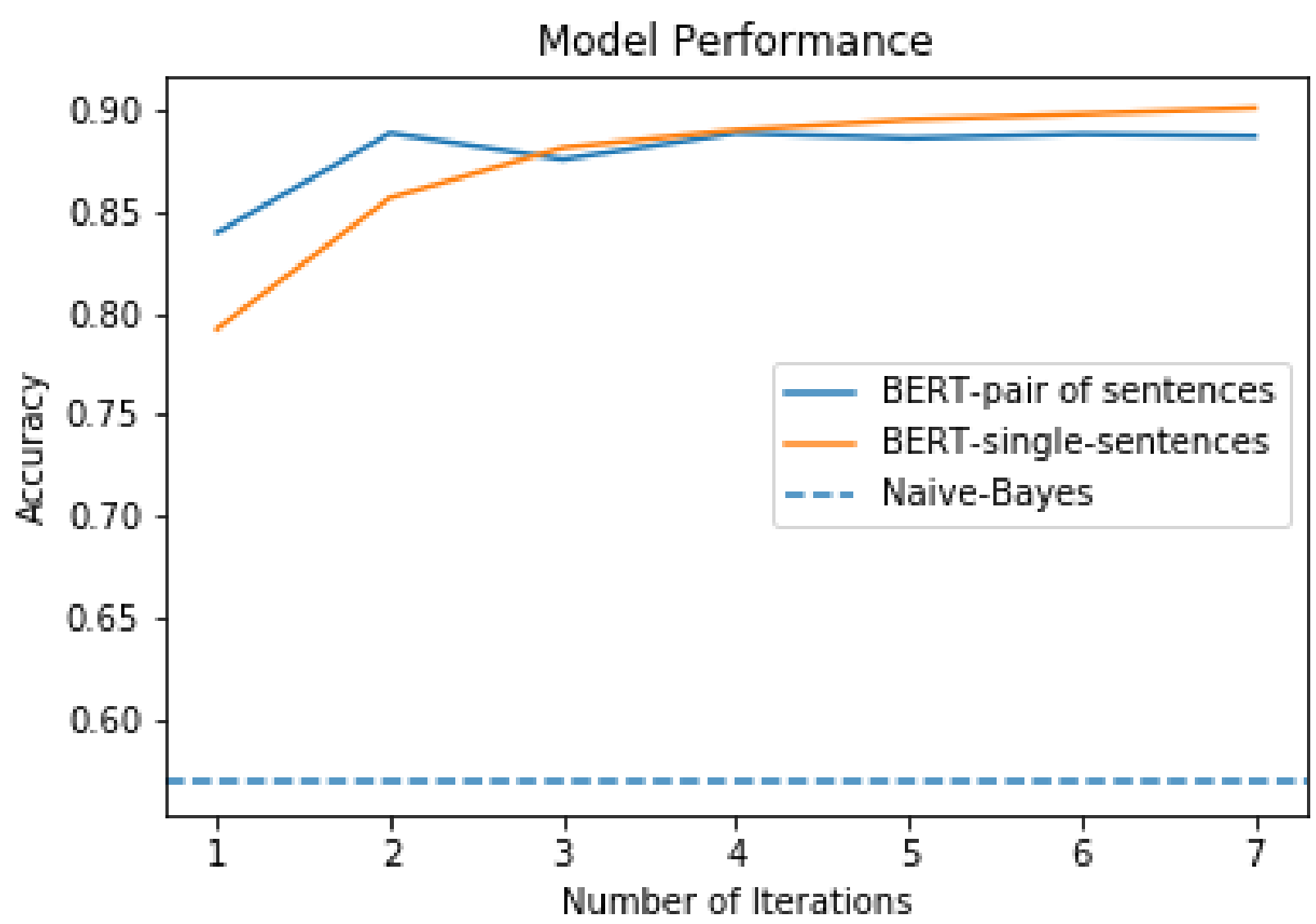


Figure: Validation Accuracy vs iterations

Model	Accuracy (%)
Naive Bayes (Baseline)	56.9
BERT (Sentence Pair)	88.71
BERT (Single Sentence)	93.47
BERT [Wang et al., 2019]	70.1
BERT (Masked LM*)	77.27

Table: Test results for the different models used for the classification task.*Masked LM is for sentence pairs that differ by a single word only (constitutes 50 percent data)

Error analysis

Examples	BERT (Sentence Pair)	BERT (Single Sentence)
* The car is driving slowly on the highway * The car is driving fast on the highway	X	X
* Getting a Ph.D. is an easy task * Getting a Ph.D. is no easy task	X	X
* I put the rubbish into a trash can * I put the rubbish into a mailbox	✓	X
* We will get pins and needles from sitting or standing for long periods of time * We will feel relaxed from sitting or standing for long periods of time	X	✓

Figure: Shows the classification of some example sentence pairs for the BERT (Sentence Pair) and BERT(Single Sentence) models

Future work

Incorporate commonsense reasoning knowledge from ConceptNet

[Devlin et al., 2018] Devlin, J., Chang, M.-W., Lee, K., and Toutanova, K. (2018). Bert: Pre-training of deep bidirectional transformers for language understanding.